

CLAIMS

We claim:

1. An injection molding apparatus for manufacturing products containing elastomeric material within single cavity molds, said apparatus comprising,
a modular frame supporting an injection molding operation station including an injector assembly having a pressure sensitive nozzle assembly, the injector assembly engaged with an extruder assembly at a check valve assembly, and a mold servicer assembly for assembly and disassembly of single cavity molds,
a robotic assembly positioned for inserting and removing products or product components from positions within said injection molding apparatus; and
a rotating table having a plurality of positions along the periphery of the rotating table to move a single cavity mold into and out of engagement with the injection molding operation station, each position supporting a clamping assembly for clamping a single cavity mold.
2. The injection molding apparatus of Claim 1 wherein the rotating table has a substantially circular configuration.
3. The injection molding apparatus of Claim 2 wherein operation of the injector assembly, nozzle assembly, extruder assembly, robotic assembly, rotating table and clamping assemblies are all computer controlled by a central programmable controller.
4. The injection molding apparatus of Claim 1 wherein the robotic assembly is positioned at a corner of the modular frame to permit use of the robotic assembly at one or more adjacent injection molding systems.
5. The injection molding apparatus of Claim 1 wherein the modular frame includes sidewalls which are aluminum castings.
6. The injection molding apparatus of Claim 1 wherein said injector assembly and extruder assembly are configured to enable injection pressures sufficient to initiate curing of the product.

7. The injection molding apparatus of Claim 1 wherein said mold servicer assembly includes a bronze central drive cam for improved wear resistance.

8. A method for manufacturing products containing elastomeric materials using an injection molding system, comprising the steps of:

disassembling a multi-section single cavity mold at a disassembly station to reveal a mold cavity and inserting any inserts to be molded into a manufactured product into the mold cavity;

reassembling the multi-section single cavity mold and providing the assembled mold to a clamping assembly supported on a rotating table having a plurality of positions along the periphery of the rotating table, said clamping assembly maintaining the single cavity mold under pressure;

rotating the rotating table to move the single cavity mold into engagement with an injection molding operation station, the station including an injector assembly having a pressure sensitive nozzle assembly, the injector assembly engaged with an extruder assembly at a check valve assembly;

positioning the nozzle assembly of the injector assembly against the single cavity mold and injecting elastomeric material from the extruder assembly;

removing the nozzle assembly from engagement with the single cavity mold;

rotating the single cavity mold supported within the clamping assembly out of engagement with the injection molding operation station and around the rotating table during curing of the product, to the disassembly station; and

disassembling the single cavity mold at the disassembly station and removing the cured product from the single cavity mold.

9. The method of Claim 8 further comprising the step of synchronizing operations at each of the stations and positions to provide in-line manufacture or cure of products within each of the clamping assemblies positioned on the rotating table.

10. The method of Claim 8 further comprising the step of removing the cured product from the injection molding apparatus using a belt conveyor positioned adjacent the mold disassembly and assembly position.

11. The method of Claim 8 further comprising the step of providing the cured product to other product finishing operations.
12. The method of Claim 9 further comprising the step of maintaining the single cavity mold under pressure sufficient to cure the product within the clamping assembly.
13. The method of Claim 9 further comprising the step of providing the product inserts to the cavity of the single cavity mold using a robotic assembly positioned on a corner of the modular frame.
14. The method of Claim 8 wherein curing the product within the multi-section single cavity mold rotating around the rotating table following engagement with the injection molding operation station until the disassembly station is reached ranges from a time of approximately 80 to 160 seconds.
15. The method of Claim 8 wherein the step of rotating the rotating table provides synchronized movement of and operations on the multi-section single cavity molds at each of the plurality of positions along the periphery of the rotating table.
16. The apparatus of Claim 1 wherein the injector assembly and the extruder assembly are supported at an angle of between 20 and 25 degrees with respect to a central axis between sidewalls of the modular frame.